Infiltration of the abdominal wall with local anaesthetic after total abdominal hysterectomy has no opioid-sparing effect

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We have measured the effect of infiltration of the deep and superficial layers of the abdominal wound on morphine consumption and pain for 48 h after operation, in 40 patients undergoing total abdominal hysterectomy, in a double-blind randomized study. Patients received wound infiltration with 0.9% normal saline 40 ml or 40 ml of 0.25% bupivacaine with epinephrine 1:200 000. There were no significant differences between groups in morphine consumption, linear analogue scores for pain at rest or on movement, nausea or sedation during the first 48 h after operation. We conclude that infiltration of the deep and superficial layers of the wound of a Pfannenstiel incision with local anaesthetic solution did not confer additional analgesia in patients undergoing major gynaecological surgery.

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Methods and results

After obtaining approval from the Local Research Ethics Committee and informed written consent, we studied 40 ASA I–II patients, aged 20–60 yr, undergoing total abdominal hysterectomy for non-malignant disease in a double-blind randomized study. A standard Pfannenstiel incision was used. Patients were excluded if they were ASA III, suffered from hepatic, cardiovascular or respiratory disease or had any contraindication to local anaesthetic drugs. All patients underwent a standard general anaesthetic comprising a sleep dose of propofol 150–200 mg followed by vecuronium 0.1 mg kg\(^{-1}\) to facilitate tracheal intubation. Anaesthesia was maintained with 1–2% isoflurane and 66% nitrous oxide in oxygen. Shortly after induction, morphine 10 mg was administered as a standard i.v. bolus to all patients together with prochlorperazine 12.5 mg.

A syringe containing 0.9% sodium chloride 40 ml (saline group) or 40 ml of 0.25% bupivacaine with epinephrine 1:200 000 (bupivacaine group) was handed to the surgeon after removal of the uterus and closure of the anterior peritoneum. The surgeon infiltrated the muscle and subcutaneous layers of the wound during the two-stage closure. In the recovery unit, patients were provided with a patient-controlled analgesia device (Abbott PCA II); this was set to deliver morphine in 1-mg boluses with a 5-min lockout. The patient, surgeon, theatre staff and acute pain team nurses responsible for follow-up of patients on PCA in the postoperative period and the ward nursing staff were blinded to group allocation.

The acute pain team nurses ensured that patients received optimum analgesia (defined as a subjective pain rating of ‘no pain at rest’) before the patient was returned to the ward; they were allowed to administer bolus doses of morphine up to 5 mg i.v. in the recovery room. If 5 mg was inadequate, the anaesthetist was called to administer further analgesia as required.

In the postoperative period, pain scores at rest and on movement were recorded by the patient using a 100-mm linear visual analogue score (VAS) ranging from 0=no pain to 100=worst pain imaginable at 8, 12, 24, 36 and 48 h. Movement was standardized as sitting upright from the
supine position. In addition, 100-mm visual analogue scores for sedation (0=wide awake to 100=very drowsy) and nausea (0=no nausea to 100=worst possible nausea) were recorded at these times.

Based on our previous studies in patients undergoing abdominal hysterectomy with the same anaesthetic technique, the study had 90% power of detecting a two-sided significant difference at the 5% level of 30 mg in morphine consumption over 48 h.

Data were analysed using SPSS version 7 for Windows. Area under the curve (AUC) of the visual analogue scores for pain at rest and on movement, sedation and nausea from 0–48 h were calculated and the mean values for AUC compared using unpaired t tests (two-tailed). *P*<0.05 was considered statistically significant.

The two groups were comparable in age, weight and height. There were no significant differences in any variable, including duration of surgery. In particular, there was no significant difference in morphine consumption during the first (*P*=0.74) or second (*P*=0.95) 24-h period after operation and no significant difference in pain scores at rest (*P*=0.21) or on movement (*P*=0.88) (Table 1). Also, there were no significant differences in nausea or sedation scores between groups.

**Comment**

In this study, infiltration of the muscle and subcutaneous layers of the wound of a Pfannenstiel incision with 0.25% bupivacaine–epinephrine 1:200 000 had no opioid-sparing effect. PCA morphine consumption in the first and second 24-h periods was almost identical in the two groups (Table 1), and there was no difference in pain scores at rest or on movement.

There are few studies examining the effects of wound infiltration of the subcutaneous and deeper layers (e.g. intrasfascial or i.m.) after intra-abdominal surgery. Infiltration of the subcutaneous and intrasfascial layers of the wound with 0.25% bupivacaine 50 ml reduced opioid requirements in the first 3 days after cholecystectomy. Superficial wound infiltration combined with bilateral ilioinguinal nerve blocks after Caesarean section reduced postoperative pain and requirements for additional analgesics. In contrast, subcutaneous infiltration of 0.5% bupivacaine alone into the wound edges had no clinically important effect on morphine consumption after Pfannenstiel incision for lower segment Caesarean section and no effect after abdominal hysterectomy. In the latter study, postoperative observation for a morphine-sparing effect was continued for only 6 h.

It is possible that the lack of difference between groups in this study was related to large differences in pain scores and morphine requirements between patients. Individual pain scores varied widely despite the use of PCA. Inter-individual differences in pain scores may reflect patient perception of pain, differences in opioid effect or differences in pharmacokinetics. Another possibility would be that the dose or concentration of bupivacaine was inadequate. A large volume of a dilute solution (40 ml of 0.25%) was chosen to ensure spread throughout the wound layers. However, this dose is similar to that used in two other studies which showed benefit from wound infiltration.

A more likely explanation is that pain arising from viscera and deeper peritoneal layers is of greater significance than that from cutaneous, subcutaneous and muscular layers of a wound incision. Afferents from deeper structures would be unaffected by wound infiltration.

We found that infiltrating the subcutaneous and muscular layers of a Pfannenstiel incision with local anaesthetic did not reduce PCA morphine consumption or pain scores for the first 48 h after total abdominal hysterectomy. This may be because deeper structures are responsible for much of the painful stimulus. Other methods of analgesia such as i.p. infiltration with local anaesthetics or adjuvant use of non-steroidal anti-inflammatory drugs may prove more effective alternatives.

**References**